

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Previously Presented)

A substrate processing apparatus that removes an unwanted material on a surface of a peripheral portion of a substrate through etching by supplying etching liquid to the surface of the peripheral portion, the apparatus comprising:

a substrate holding mechanism that holds a substrate;

an etching liquid supplying mechanism that supplies the etching liquid to the peripheral portion of the substrate held by the substrate holding mechanism; and

an annular member, the annular member being a continuous ring that has an inner periphery inside an outer periphery of the substrate held by the substrate holding mechanism and thereby defines, by said inner periphery, a continuous annular ring-shaped processing width to be processed by the etching liquid on the surface of the peripheral portion of the substrate held by the substrate holding mechanism, the annular member being disposed with a spacing from the substrate holding mechanism such that a gap is formed at the surface of the peripheral portion of the substrate, maintaining a continuous annular ring-shaped film of the etching liquid in contact with the annular member and with the surface of the peripheral portion of the substrate held by the substrate holding mechanism;

wherein the annular member includes a substrate-opposing surface comprising a plane portion extending substantially parallel to and facing the peripheral portion of the substrate and spaced upward from said substrate to form said gap, and a projection at the inner periphery of the annular member that protrudes downward and toward the substrate from the substrate-opposing surface and thereby limits the etching liquid entering an inner region of the substrate.

Claim 2 (Canceled)

Claim 3 (Original)

The substrate processing apparatus according to Claim 1, further comprising:
a substrate holding mechanism that holds the substrate from one surface side thereof, wherein the annular member is placed on the other surface side of the substrate.

Claim 4 (Original)

The substrate processing apparatus according to Claim 1, wherein:
the etching liquid is supplied to the peripheral portion of the substrate from the etching liquid supplying mechanism while the substrate is held at rest.

Claim 5 (Original)

The substrate processing apparatus according to Claim 1, wherein:
the substrate is a substrate of a nearly circular shape;
the apparatus further comprises a substrate rotating mechanism that rotates the substrate; and
the inner periphery of the annular member is of a circular shape having an inside diameter equal to or smaller than a diameter of the substrate.

Claim 6 (Previously Presented)

The substrate processing apparatus according to Claim 5, wherein:
the etching liquid is supplied to the peripheral portion of the substrate from the etching liquid supplying mechanism while the substrate is rotated by the substrate rotating mechanism.

Claims 7-8 (Canceled)

Claim 9 (Withdrawn- Previously Presented)

The substrate processing apparatus according to Claim 1, wherein:
the substrate-opposing surface is an inclined plane inclined to reduce an interval between the substrate-opposing surface and the substrate as heading toward the inner periphery.

Claim 10 (Withdrawn- Previously Presented)

The substrate processing apparatus according to Claim 1, wherein:
an outer periphery of the substrate-opposing surface is located outside the outer periphery of the substrate.

Claim 11 (Canceled)

Claim 12 (Withdrawn- Currently Amended)

The substrate processing apparatus according to Claim 1, wherein:
the projection includes, on a side thereof toward an outer side of the annular member, an etching liquid limiting surface having an inclined plane that heads toward an outside of the substrate as going away from a surface of the substrate.

Claim 13 (Withdrawn- Previously Presented)

The substrate processing apparatus according to Claim 1, wherein:
the annular member includes a liquid discharge path that opens in the substrate-opposing surface and communicates with an external space of the annular member.

Claim 14 (Withdrawn- Previously Presented)

The substrate processing apparatus according to Claim 1, wherein:
the etching liquid supplying mechanism includes a liquid dispense path made in the annular member and including a dispense port that opens in the substrate-opposing surface.

Claim 15 (Withdrawn- Previously Presented)

The substrate processing apparatus according to Claim 1, wherein:
the etching liquid supplying mechanism includes a dispense port that opens in the substrate-opposing surface, a liquid-receiving portion that communicates with the dispense port, and a nozzle that supplies the liquid-receiving portion with the etching liquid.

Claim 16 (Withdrawn)

The substrate processing apparatus according to Claim 15, wherein:
the annular member is placed so that the substrate-opposing surface opposes the substrate from above; and
the liquid-receiving portion is formed in an upper surface of the annular member.

Claim 17 (Original)

The substrate processing apparatus according to Claim 1, wherein:
the etching liquid supplying mechanism includes a nozzle that supplies the etching liquid toward a surface of the substrate on an opposite side to a surface containing the surface of the peripheral portion.

Claim 18 (Original)

The substrate processing apparatus according to Claim 17, wherein:
the nozzle supplies the etching liquid toward a central portion of the surface on the opposite side.

Claim 19 (Original)

The substrate processing apparatus according to Claim 17, wherein;
the annular member has an outer wall surface positioned inside the outer periphery of the substrate.

Claim 20 (Withdrawn)

The substrate processing apparatus according to Claim 19, wherein;
the etching liquid supply mechanism includes a nozzle provided outside the annular member.

Claim 21 (Withdrawn)

The substrate processing apparatus according to Claim 1, wherein:
the etching liquid supplying mechanism includes a nozzle that supplies the etching liquid

toward an outer wall surface of the annular member.

Claim 22 (Original)

The substrate processing apparatus according to Claim 1, wherein:

the etching liquid supplying mechanism includes a dispense port through which the etching liquid is dispensed in a direction perpendicular to a surface of the substrate or a direction inclined toward an outside of the substrate.

Claim 23 (Currently Amended)

The substrate processing apparatus according to Claim 1, wherein:

the annular member includes an inner wall surface at ~~that rises from~~ the inner periphery extending in a direction ~~to go~~ away from a surface of the substrate.

Claim 24 (Withdrawn)

The substrate processing apparatus according to Claim 23, wherein:

the inner wall surface is an inclined plane that heads toward a center of the substrate as going away from the surface of the substrate.

Claim 25 (Currently Amended)

The substrate processing apparatus according to Claim 27 ~~±~~, further comprising:

a lid member that substantially blocks said ~~clogs an~~ internal space of the annular member.

Claim 26 (Currently Amended)

The substrate processing apparatus according to Claim 25, further comprising wherein:

a center plate member in said internal space, coupled to said top lid portion from below, said center plate member defining with said top lid member a flow path for said gas, and defining a gas nozzle with said inner periphery of said annular member; and

~~the annular member includes~~ a continuous annular groove formed in said center plate member adjacently inside the inner periphery of said annular member.

Claim 27 (Original)

The substrate processing apparatus according to Claim 1, further comprising:
a gas supplying mechanism that supplies an internal space of the annular member with a gas.

Claim 28 (Original)

The substrate processing apparatus according to Claim 27, wherein:
the annular member includes an inner wall surface that rises from the inner periphery in a direction to go away from a surface of the substrate, and the gas supplied from the gas supplying mechanism is supplied toward the inner wall surface.

Claim 29 (Currently Amended)

The substrate processing apparatus according to Claim 1-23, wherein:
the annular member includes a gas flowing path that allows a communication between an internal space and an external space of the annular member.

Claim 30 (Original)

The substrate processing apparatus according to Claim 1, further comprising:
a protection liquid supplying mechanism that supplies etching protection liquid toward a center of the substrate at an inner side of the annular member.

Claims 31-61 (Canceled)

Claim 62 (Previously Presented)

The substrate processing apparatus according to claim 1, wherein the peripheral portion is selectively etched by the etching liquid at an area defined by the annular member.

Claims 63-65 (Canceled)